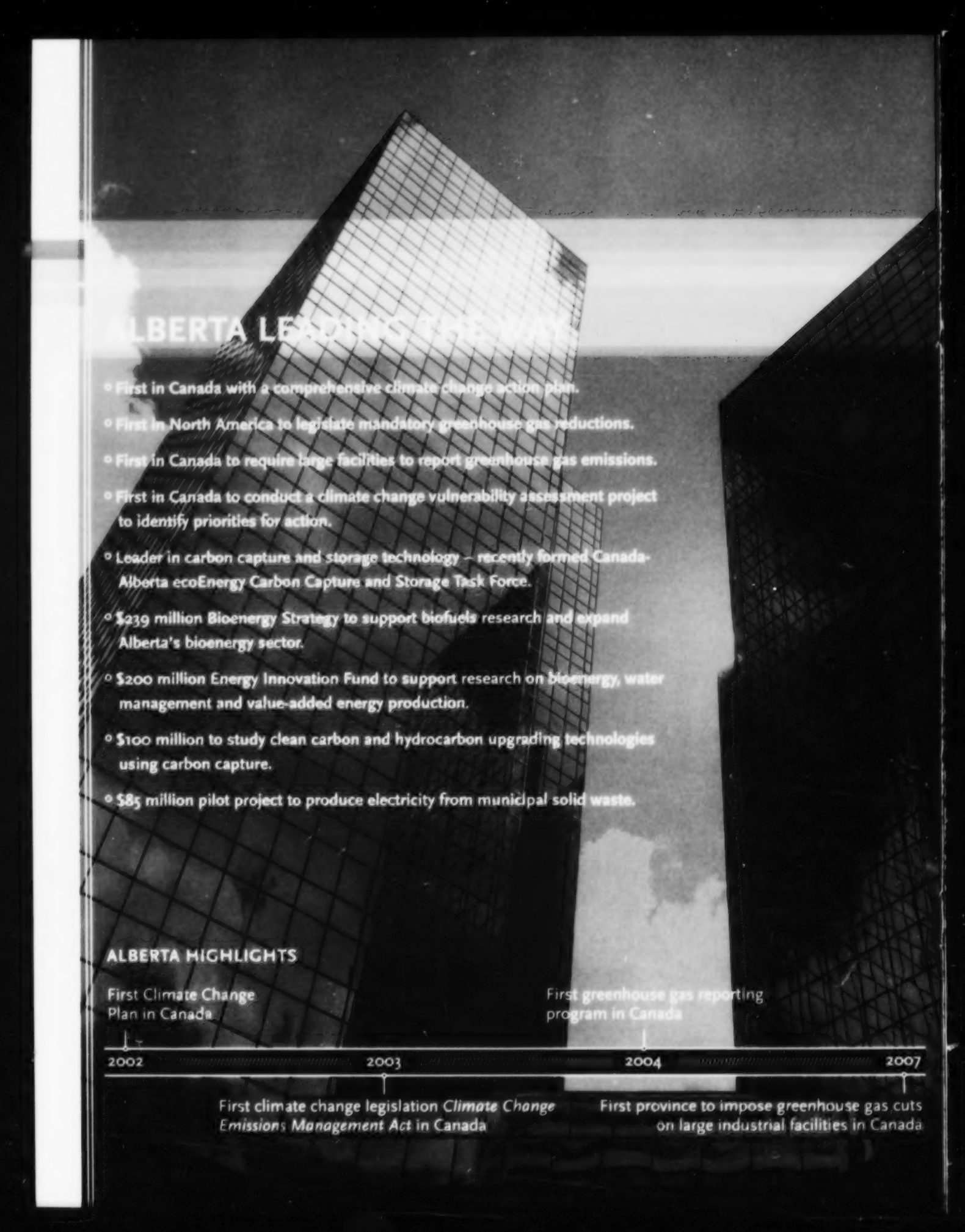
Albertans and Climate Change: *Moving Forward*

Alberta



ALBERTA LEADERSHIP

- First in Canada with a comprehensive climate change action plan.
- First in North America to legislate mandatory greenhouse gas reductions.
- First in Canada to require large facilities to report greenhouse gas emissions.
- First in Canada to conduct a climate change vulnerability assessment project to identify priorities for action.
- Leader in carbon capture and storage technology – recently formed Canada-Alberta ecoEnergy Carbon Capture and Storage Task Force.
- $239 million Bioenergy Strategy to support biofuels research and expand Alberta's bioenergy sector.
- $200 million Energy Innovation Fund to support research on bioenergy, water management and value-added energy production.
- $100 million to study clean carbon and hydrocarbon upgrading technologies using carbon capture.
- $85 million pilot project to produce electricity from municipal solid waste.

ALBERTA HIGHLIGHTS

First Climate Change Plan in Canada

First greenhouse gas reporting program in Canada

2002 — 2003 — 2004 — 2007

First climate change legislation *Climate Change Emissions Management Act* in Canada

First province to impose greenhouse gas cuts on large industrial facilities in Canada

TAKING ACTION: FIVE YEARS OF SUCCESS

In October 2002, Alberta released Canada's first comprehensive action plan to deal with climate change. *Albertans and Climate Change: Taking Action* set out key directions aimed at helping governments, industry, and individual Albertans take realistic, tangible actions to reduce greenhouse gases.

Alberta's *Taking Action* plan focused on four main areas:

- better emissions management;
- enhancing technology to control industrial emissions;
- improving energy efficiency; and,
- developing renewable energy sources.

Albertans have always been leaders on environmental issues. Alberta was, in fact, the first province in Canada to establish an environment ministry.

Now Alberta is continuing to help lead the nation with concrete action to deal with climate change. We are the first province in Canada to require large emitters to report on greenhouse gas emissions, and we are the first to legislate mandatory greenhouse gas reductions.

As we approach the five-year anniversary of the *Taking Action* plan, Albertans continue to demonstrate their commitment to protecting their environment now and for future generations, and to ensuring the province remains clean and sustainable.

What are Greenhouse Gases?

The main greenhouse gases are carbon dioxide, methane, nitrous oxide, along with hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. Each year, human activities throughout the world add more than seven billion tonnes of greenhouse gas into the atmosphere.

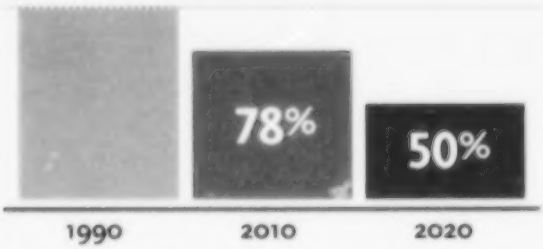
What is Emissions Intensity?

Greenhouse gas emissions measured against some other factor like the Gross Domestic Product (GDP) of a nation, province or state. Other standards by which emissions intensity can be measured include: per barrel of oil; per million cubic feet of natural gas; per tonne of coal, cement, etc. produced; or per megawatt hour of electricity.

BETTER EMISSIONS MANAGEMENT

Alberta's *Taking Action* plan establishes emissions intensity targets. By 2010, Alberta will reduce emissions intensities by 22 per cent below 1990 levels. And, by 2020, Alberta will reduce emission intensities by 50 per cent below 1990 levels. In 2004, just two years after Alberta's *Taking Action* plan was released, Alberta's emissions intensity had already decreased by 16 per cent from the 1990 levels.

Emission Intensities

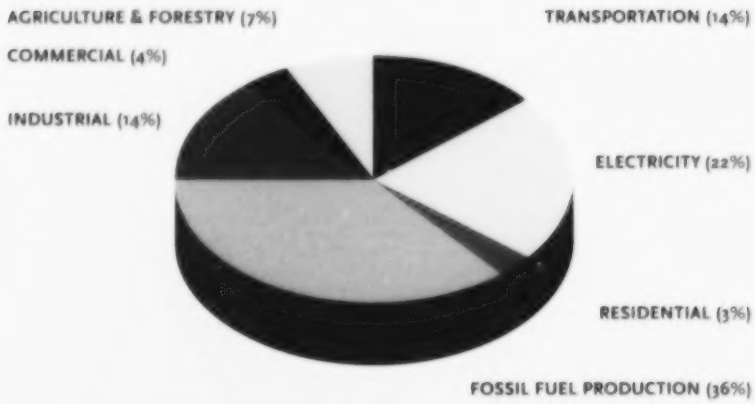


▸ By 2020, the province will reduce greenhouse gas relative to Gross Domestic Product (GDP) by 50 per cent below 1990 levels–a reduction of about 60 million tonnes of carbon dioxide equivalent gases below expected levels.

Climate Change Legislation

- Alberta's *Climate Change and Emissions Management Act*, passed in 2003, is the only climate-change specific legislation in Canada. It is the backbone of Alberta's plan to reduce emissions intensities by 2020.
- The *Climate Change and Emissions Management Act* sets out industrial emissions intensity targets starting July 1, 2007.
- Alberta is the first jurisdiction in North America to impose greenhouse gas cuts on large industrial facilities across several sectors.

Total Alberta GHG Emissions (2004)



Alberta's Large Industrial GHG Emissions (2005)

Source: Facts about Climate Change (AB Environment)

Greenhouse Gas Reporting

- In 2004, Alberta introduced Canada's first specified gas reporting program retroactive to 2003 for large industrial facilities. Facilities that produce 100,000 tonnes or more of greenhouse gases per year are required to report.
- Greenhouse gas reporting is enabling Alberta to develop a better understanding of the nature of its greenhouse gas emissions sources. It also helps industry better manage its own emissions, allowing industry to track progress and understand opportunities for emission reductions.

ENHANCING TECHNOLOGY

Technology is a key element of Alberta's plan. The Alberta government leads the way in supporting research to develop technologies and innovations that, over the long term, will reduce emissions and improve energy efficiency.

At the same time, Alberta's industries and governments are employing the technology that is available today to improve efficiency and reduce the intensity of greenhouse gas emissions.

Alberta universities and research organizations are partnering to advance our knowledge in promising areas such as geothermal energy, enhanced recovery of conventional energy, and coal gasification that will allow Alberta to use coal to cleanly generate electricity.

Alberta's *Taking Action* plan places emphasis on developing carbon sequestration – technologies aimed at capturing, compressing, and storing carbon dioxide in geological formations. With a number of large sources of emissions, and favourable geology, carbon sequestration technology is important and promising. Carbon sequestration offers Alberta the opportunity to reduce greenhouse gas emissions, while providing a new way to enhance conventional energy recovery.

Alberta will continue to be at the forefront of research and innovation. By developing new technologies, Alberta can and will make a global contribution to the climate change issue.

Calgary-based Suncor, with refineries in Colorado and Ontario, has lowered its company-wide greenhouse gas emissions intensity from 1990 levels by 25 per cent, thanks to dramatic new technologies and day-to-day management of energy use.

Meanwhile, Syncrude Canada Ltd. – a joint venture of eight companies, including Calgary-based firms like the Canadian Oil Sands Trust, Imperial Oil, Petro-Canada and Nexen – is spending $700 million on the Syncrude Emissions Reduction Project. It will reduce stack emissions of sulphur compounds by 60 per cent from current levels of 245 tonnes per day. The project is currently under construction, and is expected to be fully integrated by 2011. Syncrude has reduced its emissions per barrel by 14 per cent between 1990 and 2004, thanks in large part to technologies developed at the company's Edmonton research centre. Syncrude spends about $40 million a year on research and development – much of which is aimed at being greener.

Dan Woynillowicz, policy analyst for environmental advocacy group the Pembina Institute, says there is good work being done in the oilsands industry.

Shell Canada Ltd., the majority partner in the Athabasca Oil Sands Project, deserves credit for going beyond federal and provincial governments regulations on greenhouse gas emissions, he says.

"Shell is a standout in terms of acknowledging the magnitude of the global warming issue, and acknowledging that they have both an obligation and opportunity to manage their greenhouse gas pollution in a proactive and responsible way."

Calgary Herald, June 5 2007

IMPROVING ENERGY EFFICIENCY

Alberta has worked hard to improve energy conservation and efficiency. An important goal in the *Taking Action* plan was to ensure that Albertans and Alberta industries and organizations would have a clear understanding of the role they can play and the tools they can use to reduce the greenhouse gas intensity of their activities.

In 1999, the Government of Alberta broke new ground by formally establishing Climate Change Central. A unique private-public partnership, Climate Change Central has been at the forefront of helping Albertans reduce their own emissions.

Climate Change Central aims to make Albertans more aware of the amount of energy they use, and to encourage Albertans to take steps to make their homes energy efficient, make efficient vehicle choices, or use public transit. Together with its energy efficiency office, Energy Solutions Alberta and Climate Change Central are helping Albertans reduce greenhouse gas emissions.

▸ Solution gas flaring in Alberta has been reduced by 71.5 per cent since 1996, and solution gas venting has been reduced by 56.4 per cent since 2000. Those reductions have kept approximately eight million tonnes of greenhouse gas emissions (CO_2 equivalent) from being released into the atmosphere–equivalent of taking about 1.7 million cars off of Alberta's roads for one year.

At the same time, the Alberta government has led the way in bringing greater energy efficiency to government operations. Through Climate Change Central, Alberta is also helping municipal governments improve their energy conservation. Through various initiatives, Albertans are reducing greenhouse gas emissions.

Furnace Rebate Program

- Albertans have replaced more than 5,700 old furnaces with energy efficient models, cutting greenhouse gas emissions by 90,000 tonnes.

Soak up the Savings

- Launched in 2005, Soak up the Savings offers consumers a rebate to replace and recycle their old clothes washers with new Energy Star qualified models.

Exit to Savings

- By replacing more than 7,000 exit signs in multi-unit residences with energy saving LED signs, the Exit to Savings program will reduce greenhouse gas emissions by 50,000 tonnes over the 25-year life of the signs.

OnFarm Energy Efficiency

- Beginning in spring 2007, the $1 million program supports 100 energy efficiency audits of Alberta dairy, swine and poultry producers' farms, resulting in reduced costs and improved environmental performance through increased energy efficiency of their operations.

ME First

- Municipal Energy (ME) First has provided more than $30 million in interest free loans for 60 projects to increase energy efficiency in municipal buildings. The program has resulted in greenhouse gas reductions while helping municipalities save over $2.8 million a year in operating costs.

Hail a Hybrid

- Hail a Hybrid provides participating taxi owners an incentive towards the purchase of a hybrid vehicle. In return, operators will monitor the long-term operating costs of hybrids versus conventional taxis.

Reduce Idling Campaign

- This campaign has the simple but effective goal of getting motorists to turn off their engines when they are parked or stopped for more than 10 seconds, except in traffic. Idling for just 10 seconds uses more fuel than restarting an engine.

Car Heaven

- Run in Alberta by Climate Change Central, the Car Heaven old vehicle donation program has recycled nearly 3,500 high-polluting vehicles, and the program continues to gain momentum, with donations doubling in 2006. That's big news in a province where half of our emissions from transportation come from private vehicle use. Last year alone, the Car Heaven program in Alberta reduced an estimated 8,400 tonnes of carbon dioxide and 2,625 tonnes of smog-forming pollutants.

Greener Building

- Alberta has adopted *Leadership in Energy and Environmental Design* (LEED) silver standards for new government building construction to ensure energy efficiency and to take into account water use, recycling and waste management and other environmental factors.
- The Alberta government has completed energy improvements on all 200 government-owned facilities. Since 1990, the Alberta government has cut its greenhouse gas emissions by approximately 50 per cent – that's 58,000 tonnes per year – and saved taxpayers $6 million a year as a result of retrofitting government buildings.
- In 2006, Alberta adopted Go Green, a national certification program administered by the Building Owners and Managers Association (BOMA) for government building operations to improve the energy efficiency of heating, air conditioning, and lighting systems
- Ten new Alberta schools will meet or exceed new energy efficiency standards, including a school in Vulcan, Alberta, that will be one of the most energy-efficient schools in Canada.

"Climate Change Central shows what's possible when government, the private sector and Albertans work together."

▸ Alberta's Climate Change Central (www.climatechangecentral.com) was the first agency of its kind in Canada. Established by the Alberta government, the innovative public-private partnership has implemented a number of programs aimed at improving energy conservation and reducing greenhouse gas emissions in Alberta.

"Climate Change Central shows what's possible when government, the private sector and Albertans work together."

Premier Stelmach

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Research and Investment

- Alberta has invested $200 million to create the Energy Innovation Fund, which supports studies and research into bioenergy, water management, value-added energy production, nanotechnology and applied university research. The fund builds on world-class knowledge, expertise and leadership for responsible development of Alberta's vast energy resources for the benefit of current and future generations.
- Research investment of $85 million is supporting a pilot plant to demonstrate the production of synthetic gas and electricity from municipal solid waste and other low grade fuels.
- Under the Energy Innovation Fund, Alberta Energy and the Alberta Energy Research Institute have launched a $100 million initiative to demonstrate the next generation of clean carbon and hydrocarbon upgrading technologies with capture of carbon dioxide.
- The Alberta Energy Research Institute is investing $50 million over five years to support several research and technology projects designed to reduce natural gas use, reduce water use and improve efficiency in energy production and value-added energy products.
- The Alberta government is investing $260 million in a University of Calgary facility to house its Institute for Sustainable Energy, Environment and Economy (ISEEE). The multidisciplinary ISEEE program – the first of its kind in Canada – draws upon expertise in oil and gas, environmental and petroleum engineering, geology, economics, commerce, law and sustainable development to educate post-secondary students and conduct research.
- Research organizations, like the Alberta Research Council in partnership with universities and others, are doing innovative work to develop the next generation of technologies to reduce emissions.

Carbon Storage

- Alberta is a leader in the promotion and exploration of carbon capture and storage. On March 8, 2007, Alberta and Canada announced the formation of a Canada-Alberta ecoENERGY Carbon Capture and Storage Task Force. The Task Force will examine opportunities for large scale application of carbon capture and storage technology in Canada. The Task Force will report its findings and recommendations by November.
- Alberta Environment and the Alberta Energy Research Institute are leading a $25 million monitoring and evaluation research project on the long-term reliability of storing carbon dioxide in geological formations.

- A series of pilot programs is underway in partnership with industry to better understand the environmental and economic benefits of using carbon dioxide for enhanced resource recovery, including projects to monitor and verify the storage of carbon dioxide in the reservoir.
- Alberta's $155.9 million share of the Canada ecoTrust fund will be used to move forward on clean energy projects, including work towards developing a large-scale carbon dioxide capture and storage system.
- Through the I-CAN Centre for the Conversion of Carbon Dioxide, the Alberta Energy Research Institute and Alberta Advanced Education and Technology's Life Sciences Institute are providing $100,000 for a research project involving the sequestration of carbon dioxide using micro-algae.
- The province is also working with industry to develop protocols to allow forestry and agriculture industries to use biologically sequestered carbon to offset greenhouse gas emissions.

Clean Coal

- Alberta is investing $33 million into front-end engineering design research to find the cleanest ways to generate electricity from Alberta's vast reserves of coal. The results of the study will be available to members of the Canadian Clean Power Coalition and Alberta companies.
- The University of Alberta, with industry, has established a $1.9 million Industrial Research Chair in Advanced Coal Cleaning and Combustion Technology. The program will bring together some of the best minds in university and industry to develop clean coal technologies.
- Alberta is investing in "coal gasification" technology – converting coal into clean power while capturing carbon dioxide – to generate electricity in a clean way. Alberta companies and institutions are also leading initiatives to minimize the environmental impact of using coal.

Alberta's Oil Sands

- **Even in the face of expanding production, oil sands producers have curtailed the growth of carbon emissions through technological and operational changes.**
- **As a result, the amount of carbon dioxide emissions generated per barrel of oil has been reduced by 45 per cent since 1990.**

DEVELOPING RENEWABLE ENERGY SOURCES

Alberta's competitive advantage lies in its endowments of oil, natural gas, coal and oil sands. These will play a significant role in Alberta's economy and energy landscape, and that's why new technologies and improving energy efficiency are important aspects of Alberta's plan.

Albertans recognize the role that other energy sources can also play. Increasingly, Albertans are taking advantage of green power options offered by utilities companies, and asking more about biodiesel and wind power.

Taking Action sets out a vision of ensuring that Alberta's renewable and alternative energy sector makes a growing and significant contribution to the province's energy mix. The Alberta government has been taking meaningful steps to promote the development and use of alternative and renewable energy sources, and continues to work at making sure renewable energy can play a key part in the province's response to climate change.

Green Power Operations

- Since 2005, **90 per cent of the electricity to power Alberta government owned buildings is purchased from certified renewable and alternative sources, including wind power and biomass.**

Wind Power

- Albertans are taking advantage of renewable and alternative energy. **Alberta produces more wind power than any other province in Canada.** By 2008, more than 12.5 per cent of Alberta's total electricity will be generated from renewable and alternative sources, primarily wind and biomass.

Biofuels

- Alberta is an emerging Canadian leader in the biofuel industry. Alberta has taken action to encourage and promote biofuels, investing over **$239 million to support biofuels research and strengthen and expand Alberta's bioenergy sector.**

Solar Power

- Climate Change Central is leading the Alberta Solar Municipal Showcase, a renewable energy demonstration project involving 20 municipalities across Alberta. Project participants will showcase grid-connected solar electric systems on highly-visible public buildings.

ADAPTING TO CLIMATE CHANGE

As Alberta continues to work on reducing greenhouse gas emissions, work is also underway to assess and evaluate ways to adapt to the impacts of climate change and to develop new technologies and approaches. These would not only benefit Alberta, but also could be marketed or shared around the world.

Alberta's climate change adaptation strategy calls for action to:

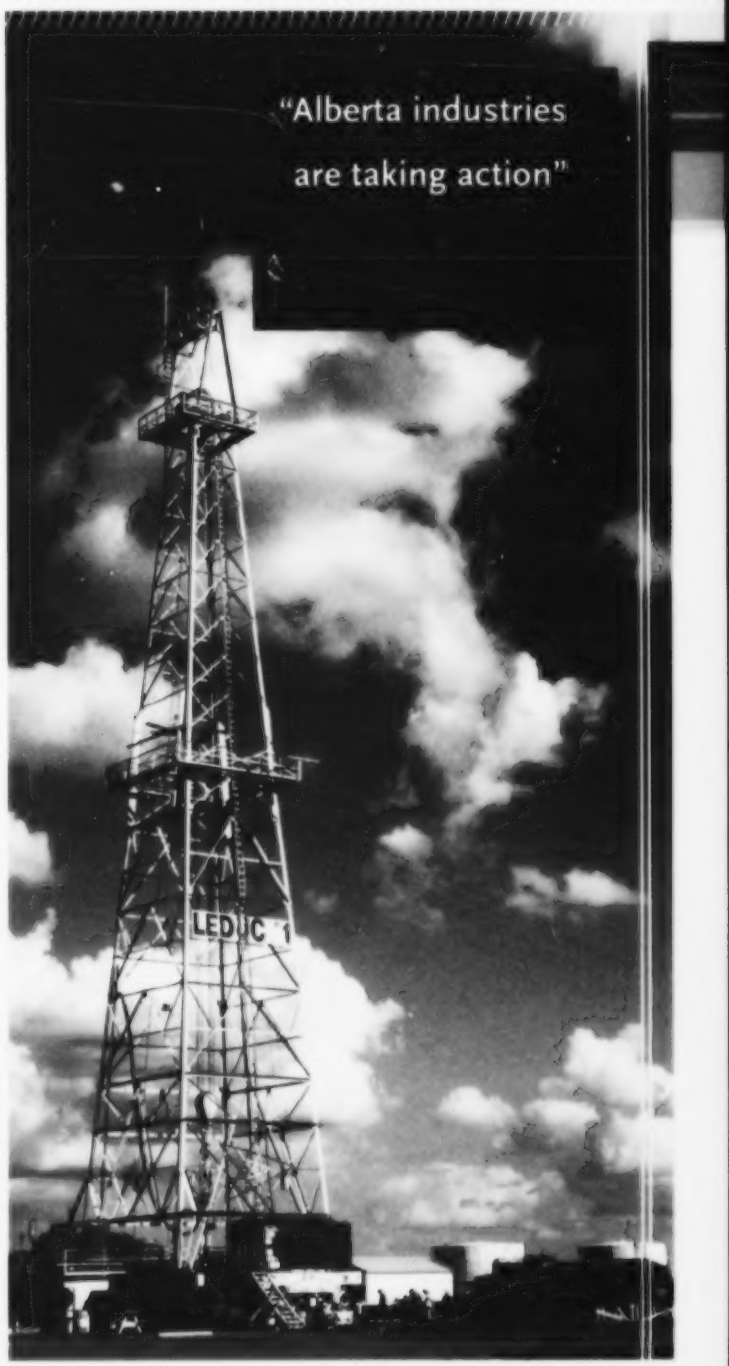
- establish an adaptation research program including cooperation with other governments in Canada;
- help Albertans explicitly address the risks of short-term climate variability and extremes – notably in the management and planning for agriculture, forestry, health, municipalities, infrastructure and water; and
- keep Albertans informed of the risks and opportunities of climate change and engage them in efforts to adapt.

Alberta is now undertaking a *Vulnerability Assessment Project*, which will examine biophysical, social and economic vulnerabilities to climate change in Alberta. The assessment will identify priorities for action, and will be used to develop a climate change adaptation framework for Alberta.

Some examples of adaptation strategies include:

- Developing crops that are more resistant to drought and introducing crops from other regions that are more suitable for a changed climate.
- Exploring ways of reducing water use in key industries including the energy industry and agriculture.
- Putting land use policies in place to preserve wetlands and natural areas.
- Reviewing standards for buildings, roads and highways to ensure they will withstand challenges caused by a changing climate and climate extremes.

Alberta will also participate in a Premiers conference on the issue of climate change adaptation, to be held early in 2008.



ADAPTING TO CLIMATE CHANGE

"Alberta industries are taking action"
Bob Page, Professor of Environmental Management and Sustainability, University of Calgary; Calgary Herald, June 5, 2007

MOVING FORWARD

Over the last five years, Albertans have taken meaningful, tangible steps to improve their energy efficiency and help reduce greenhouse gas emissions. From changing appliances, to adopting better industrial practices, Albertans are leading the way in concrete actions on climate change.

The Alberta government is also moving forward in its work. Alberta was the first government in Canada to develop a comprehensive climate change plan, the first to adopt climate change legislation with emissions targets, and the first to require industrial greenhouse gas reporting and emissions reductions. Alberta plans to build on this leadership and these five years of success.

Alberta's New Climate Change Legislation

Starting July 1, 2007, new climate change legislation came into effect in Alberta. The legislation applies to all industrial facilities that emit 100,000 tonnes or more of greenhouse gases a year. Such facilities account for about 70 per cent of Alberta's industrial greenhouse gas emissions.

Affected industrial facilities are now required to take actions to reduce their emissions intensity. The legislation provides a number of compliance options for industry, which give all affected sectors the flexibility to meet their mandatory reductions.

The compliance options promote made-in-Alberta solutions to climate change that bolster Alberta's economy and encourage investment in technology that will support larger reductions in the future. They also encourage all Albertans to reduce emissions.

Improvements to Operations

- Facilities can make improvements to their operations that will result in reductions. For example, a facility could install a more efficient boiler.

Alberta-based Credits

- A facility can purchase credits from large emitters that have reduced their emissions intensity beyond their target.
- They can also purchase credits from facilities whose emissions are below the 100,000-tonne threshold but are voluntarily reducing their emissions. This includes projects in the forestry, agriculture and transportation sector.

90 per cent of electricity to power government owned buildings is purchased from certified renewable or alternative sources.

- The projects must have legitimate greenhouse gas reductions in the province. Alberta has released draft protocols that outline how to quantify and verify emission reductions for different types of projects. For example, the protocol will specify how reducing cultivation of farm land can help store more carbon in the soil.

Climate Change and Emissions Management Fund

- Companies can contribute $15 for every tonne over their reduction target into Alberta's Climate Change and Emissions Management Fund. The Fund will be directed to strategic projects or transformative technology aimed at reducing greenhouse gas emissions in the province.

The annual cost of compliance is estimated to be $177 million. This is less than 0.1 per cent of Alberta's nominal Gross Domestic Product ($242 billion in 2006). For example, if the price of electricity was eight cents per kilowatt hour, consumers may see their cost increase to 8.2 cents per kilowatt hour.

With this new legislation, Alberta becomes the first province in Canada, and the first jurisdiction in all of North America, to impose sweeping greenhouse gas cuts on large industrial facilities.

MEETING THE CHALLENGE

Alberta's situation is truly unique in Canada. Alberta is Canada's largest producer of non-renewable natural resources. Alberta's oil sands constitute the world's second-largest hydrocarbon reserve. Oil and gas industry investment in Alberta has reached over $30 billion in 2007, and the sector is the centerpiece of Alberta's economy.

Alberta: A Global Energy Leader

In the face of increasing world wide demand for energy, Alberta has undergone an unprecedented economic expansion – one that is fueling the entire Canadian economy. As a result, Alberta's total emissions have increased. But despite this expansion, the hard work of Albertans has reduced the growth rate of those emissions.

Wrestling down the growth of our emissions has been an important step; now there's more to be done, and Albertans are moving forward on further reducing emissions.

As we reach the five year anniversary of *Taking Action*, the Alberta government is updating its climate change action plan.

The updated plan will incorporate public, stakeholder and expert feedback received in a series of consultation sessions held across the province between March and June 2007.

The overwhelming message received from Albertans during these consultations has been clear: Alberta is leading the way, but Alberta can and must do more.

All Albertans want to be part of the climate change solution. They want the province to be clean for present and future generations, and want to know how they can help in their everyday lives.

They want Alberta to lead in developing new technologies aimed at further reducing greenhouse gas emissions, and want to lead in using energy more efficiently and effectively.

Albertans want climate change, like all other environmental considerations, to become a regular part of how the public and private sectors do business.

This fall, the Alberta government will introduce a new climate change action plan that builds on past work, and meets the demands of Albertans, a new plan that will again feature realistic, tangible actions.

Reducing greenhouse gas emissions and addressing climate change needs action on the part of all governments in Canada and around the world.

The Alberta government, and all Albertans, are doing their part. Working together, Albertans will build on their years of success, and continue to help lead the country in taking action on climate change.

"Albertans are taking action on climate change, not just talking about it. We are positioned to build on the leadership role we have demonstrated over the last five years – working with the public and business on tangible results that address climate change and that help create a better Alberta for all Albertans." *Premier Stelmach*